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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/831,001	09/19/2001	Cindy Theresa Cornelia Cuypers	702-010717	8959
7590	12/27/2004		EXAMINER MENON, KRISHNAN S	
Richard L Byrne 700 Koppers Building 436 Seventh Avenue Pittsburgh, PA 15219-1818			ART UNIT 1723	PAPER NUMBER

DATE MAILED: 12/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/831,001	CUYPERS ET AL.	
	Examiner	Art Unit	
	Krishnan S Menon	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 06 December 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 13-24 and 27-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 13-24 and 27-34 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

Claims 13-24 and 27-34 are pending in the application after the amendment of 12/6/04.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claim 13-21 and 27-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/49477 in view of Hodgson (US 4,187,089).

Claim 13: WO 97/49477 discloses a device for treating a gas/liquid mixture comprising a tube (1 – fig 1) with inlet (A-fig1) and outlet (8-fig 1), rotating means (5-fig 1), outlet openings down-stream of the rotating means for lateral flow of the liquid drops (9-fig 1), an axial return conduit centrally located through the rotating means (12-fig 1), and divergence element in the return conduit (7-fig 1). The flow path of the mixture comprises the flow path as outlined in claim 13 (see figure 1). Re the limitation of the flow to diverge “substantially” laterally: Word substantial means “considerable in quantity” (Webster’s Collegiate Dictionary, 10<sup>th</sup> Ed.), and considerable quantity of flow could diverge from the axial direction from the nozzle 7 of WO’477. See page 4 lines 5-8, where it describes the secondary flow being drawn by the main flow due to the

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cyclonic action of the main flow, and the main flow is described as "... at least to a considerable extent radially ... together with ... 20% of the gas flow..." in page 3 lines 29-36.

WO'477 does not teach an axial obstruction in the return flow line. Hodgson teaches an axial flow obstruction (44) in a flow line that carries liquid drops in a gas stream – see the figures which would provide a substantially diverging flow from the divergence element. It would be obvious to one of ordinary skill in the art at the time of invention to use the teaching of Hodgson in the teaching of WO'477 to have the axial conical obstruction to have the gases impinge the obstruction so as to coalesce the liquid droplets in the gas stream, thereby effectively removing the final traces of liquid from the gas stream, as taught by Hodgson (see col 1 lines 45-50).

Re the amendment adding substantially vertical, the primary ref teaches a vertical device. Re the '...substantially prevent liquid creep flow along the rotating means', this is the function part of the means 'divergent element' in a means-plus-function limitation, and the WO'477 reference does teach such a divergence element (divergent element ...for...substantially prevent liquid ...; see 7-fig1 and 17-fig 2). Also, the WO'477 as modified by Hodgson would inherently have this effect, even though Hodgson does not teach this aspect.

Claim 14: Divergence element comprises slots in the return conduit – see at 46 of the figures of Hodgson. Space between the baffles are open slots.

Claim 15: The divergence means is a "substantially" conical element extending into the return conduit (Figures of Hodgson).

Claim 16: The outlet openings are a number of longitudinal slots as in instant claim 16 (9-fig 1)

Claims 17 and 18: The rotating means is a swirl element with varying outflow angle (see figure 1).

Claim 19 adds further limitation of the size of the separated droplets, which WO 97/49477 in view of Hodgson does not teach. However, it would be obvious to one of ordinary skill in the art at the time of invention to realize that the separation apparatus having similar structure as in the present application would generate similar sized droplets in a gas-liquid separation.

Claims 20 and 21 add further limitations as follows: WO 97/49477 discloses an installation (page 2 line 17- page 3 line 2; fig 1) having a vessel with a supply connections stub (A-fig 1), one or more boxes in which one or more devices for treating gas/liquid mixture is arranged (page 2 line 34 – page 3 line 2) as in instant claims 20 and 21. WO 97/49477 does not describe a liquid drain conduit from the bottom of the vessel as in claim 20. Hodgson teaches a liquid drain from the bottom of the vessel (50,52-fig 1). It would be obvious to one of ordinary skill in the art at the time of invention to provide a drain for the liquid as taught by Hodgson in the teaching of WO'477 for disposing the collected liquid.

Claim 27: limitations in claim 27 are similar to that of claim 13 – see the rejection of claim 13.

Re claims 28-32, the additional limitations are similar to that of claims 14-18, and are described in the rejections of claims 14-18 above.

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Claims 33 and 34: conical element is disposed at the end of the conduit in Hodgson - see figures of Hodgson.

2. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 97/49477 in view Hodgson (089) as in claim 13 above and further in view of WO 93/05339.

WO 97/49477 in view of Hodgson discloses a device according to claim 13 as described above, with inlet opening for the mixture (A-fig 1), and rotating means for setting the mixture to a rotating motion (5-fig 1) as in instant claim 22.

WO 97/49477 in view of Hodgson does not disclose a conical outlet with 1-30 deg cone angle as in instant claim 22 and 23 or an additional tube part as in instant claim 24. WO 93/05339 teaches such a conical outlet (3, fig 1) and an additional tube part (9-fig 1) in the outlet of a similar liquid-gas mixture separation device. It would be obvious to one of ordinary skill in the art at the time of invention to use the teachings of WO 93/05339 in the teachings of WO 97/49477 in view of Hodgson to make the outlet end conical with the additional tube part because it would decrease the carry over of the liquid droplets in the gas stream as taught by WO 93/05339 (lines 20-37, page 10)

### ***Response to Arguments***

Applicant's arguments filed 5/17/04 have been fully considered but they are not persuasive.

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In response to applicants' argument that the Hodgson ref is for a horizontal vapor-liquid separator, and that office action uses hindsight reconstruction, In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). The primary ref, WO'477, teaches a vertical unit. Hodgson ref is used to show the structure of axial obstruction and radial flow in the return conduit, and Hodgson provides a motivation for this construction. Applicants have not really substantiated that the vertical construction does make a difference.

In response to the applicants' argument that the modification of the horizontal structure of Hodgson to vertical would destroy the Hodgson ref, it is the WO'477 ref that is being modified, and there is no question of the Hodgson ref being destroyed because of it. Moreover, such a modification would not make the structure inoperable – it will coalesce the droplets even if installed vertically. Applicants need to provide evidence to prove otherwise.

In response to the argument of lack of motivation, or applicants have different reasons, these arguments were addressed before in the prior office actions.

In response to the argument that Hodgson does not teach a return conduit, this is not relevant because Hodgson is used only for the axial-obstruction, radial flow pipe in the vapor-liquid separator.

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krishnan S Menon whose telephone number is 571-272-1143. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda L Walker can be reached on 571-272-1151. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Krishnan Menon  
Patent Examiner

  
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